APPENDIX B, GLOSSARY OF TERMS

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accident environment--Resulting conditions from an accident scenario, such as blast overpressure, fragments and fire.

accident scenario--Launch vehicle and/or spacecraft condition resulting from failure model(s) at the component and/or subsystem level(s). Different failure modes can result in the same accident scenario.

astronomical unit (AU)--The distance from the Earth to the Sun. It is equal to 149,599,000 km (92,960,818 mi).

background radiation--Ionizing radiation present in the environment from cosmic rays and natural sources in the Earth; background radiation varies considerably with location.

Becquerel (Bq)--Unit of radioactivity equal to 1 disintegration per second.

Best estimate--The best estimate reflects what is considered to be the most representative mathematical models, parameter values used in the models, and probability distributions to describe inherent variability as inputs to the analysis. As such, the best estimate reflects the anticipated outcome of the radiological consequences and risk without consideration of uncertainty in either the models or parameter values.

cancer--A group of diseases characterized by uncontrolled cellular growth.

clad--Thin-walled metal enclosure that encases the outer shell of nuclear fuel and prevents the release of plutonium dioxide and alpha particles into the environment.

conditional probability--The probability that a release of radioactive material could occur given an initiating accident (i.e., the accident has occurred).

cumulative impacts--Additive environmental, health, safety and significant socioeconomic impacts that result from a number of similar activities in an area.

Curie (Ci)--A measure of the radioactivity level of a substance (i.e., the number of unstable nuclei that are undergoing transformation in the process of radioactivity decay); one curie equals the disintegration of 3.7×10^{10} (37 billion) nuclei per second and is equal to the radioactivity of one gram of radium-226.

decay heat--The heat produced by the energy of decay of radionuclides.

decay, radioactive--The decrease in the amount of any radioactive material with the passage of time due to the transformation of one nuclide into a different nuclide or into a different energy state of the same nuclide. The decay process results in the emission of nuclear radiation (alpha, beta, or gamma and neutrons) and heat.

decontamination (radioactive)--The reduction or removal of radioactive contaminants from surfaces of equipment by cleaning or washing with chemicals, by wet abrasive blasting, or by chemical processing.

de minimis--This is a concept to indicate a collective dose level at which the risks to human health are considered negligible.

deposition--In atmospheric transport terms, the settling out on ground and building surfaces of atmospheric aerosols and particles (dry deposition) or their removal from the air to the ground by precipitation (wet deposition or rainout).

dose--The amount of energy deposited in the body by ionizing radiation per unit body mass.

dose commitment--The dose that an organ or tissue would receive during a specified period of time (e.g., usually 50 years) as a result of intake (as by ingestion or inhalation), frequently over one year, of one or more radionuclides from a defined release.

dose equivalent--The product of the absorbed dose from ionizing radiation and such factors that account for the difference in biological effectiveness due to the type of radiation and its distribution in the body (measured in Sieverts [rem]). The weighting factor for beta and gamma radiation is 1, and, for alpha radiation, it is approximately 20; thus, 1 Gy (100 rad) gamma radiation is equivalent to 1 Sv (100 rem), and 1 Gy (100 rad) alpha radiation is equivalent to 20 Sv (2,000 rem).

exposure to radiation--The incidence of radiation from either external or internal sources on living or inanimate material by accident or intent:

- Background--exposure to natural background ionizing radiation
- Occupational--exposure to ionizing radiation that takes place during a person's working hours
- Population (or collective)--sum of the exposures to a number of persons who inhabit an area

gravity-assist--Using the planetary gravitational field to increase the velocity or decrease the injection energy of a spacecraft.

half-life (radiological)--The period required for the disintegration of half the atoms in a given amount of a specific radioactive substance. The half-life varies for specific radioisotopes from millionths of a second to billions of years.

health effect (for this EIS)--The impact to human health due to radiation doses. The number of excess latent cancer fatalities over and above the normal occurrence rate that

could occur in the exposed population as a result of radiation from a launch accident or swingby accident.

initiating event (failure)--An event that can begin an accident sequence if followed by systems failures.

initiating probability--The probability that an identified accident scenario and associated adverse conditions (accident environment) will occur.

ionizing radiation--Any radiation capable of displacing electrons from atoms for molecules, thereby producing ions.

isotope--One of perhaps several different species of a given chemical element with the same number of protons, which are distinguishable by variations in the number of neutrons in the atomic nucleus, but indistinguishable by chemical means.

maximum individual dose--The maximum individual dose that an individual could receive over a 50-year commitment period.

offsite--The area outside the property boundary of the CCAS/KSC site.

onsite--The area within the property boundary of the CCAS/KSC site.

onsite population--NASA, DOD and contractor personnel who are on duty at CCAS or KSC and badged onsite visitors.

Orbiter--For purposes of this EIS, a spacecraft, such as Cassini, designed to orbit a planet (i.e., a celestial body) without landing on its surface.

plutonium--A heavy artificially produced radioactive metal (atomic number 94) with 15 isotopes. The Pu-238 isotope forms the basis for the fuel in the RTG. With a decay half-life of 87.7 years, Pu-238 is produced from the neutron bombardment of neptunium-237.

proposed action--For this SEIS, the proposed action consists of completing the preparation for and implementing the Cassini mission, including launching the spacecraft for its four-year science tour of Saturn.

radiation--The emitted particles (alpha, beta, neutrons) or photons (gamma) from the nuclei of unstable (radioactive) atoms as a result of radioactive decay. Some elements are naturally radioactive; others are induced to become radioactive by bombardment in a nuclear reactor or other particle accelerator. The characteristics of naturally occurring radiation are indistinguishable from those of induced radiation.

radioactivity--The spontaneous decay or disintegration of unstable atomic nuclei, usually accompanied by the emission of ionizing radiation.

radioisotope heater unit (RHU)--An RHU is a radioisotope-fueled system consisting of a one-watt pellet of plutonium-238 dioxide, a platinum-30 rhodium (Pt-30Rh) clad, an insulation system of pyrolitic graphite (PG) and an aeroshell/impact body of fine-weave pierced fabric (FWPF). RHUs help to regulate temperatures onboard the spacecraft and the Huygens Probe.

radioisotopes--Unstable isotopes of an element that decay or disintegrate and spontaneously emit particles or electromagnetic radiation.

rem--The unit dose representing the amount of ionizing radiation needed to produce the same biological effects as one roentgen of high-penetration X-rays (about 200 kv).

risk--The accident probability coupled with the associated consequences. Risk is defined quantitatively as the product of the frequency and the consequence. Risk, for the purpose of the Cassini EIS and for this supplement, is defined as the total probability of an accident times the consequence, and summed over all accidents in a given mission phase, segment, or the overall mission.

risk assessment--A process comprising the identification of the hazards, such as patterns and level of exposure, and the evaluation of the risk (i.e., accident frequency and consequences) to affected individuals or populations from a known event.

Sievert (Sv)--The SI unit of dose equivalent. One Sv is equivalent to 100 rem.

solar energy--Energy from the Sun or heat from the Sun converted into an energy source.

source term--The quantities of materials released during an accident to air or water pathways and the characteristics of the releases (e.g., particle size distribution, release height and duration); used for determining accident consequences.

swingby--Part of the trajectory when, during an interplanetary mission, a space vehicle passes by a planet to use the planetary gravitation to change course and to obtain additional velocity/momentum.

trajectory--The flight path that a spacecraft will take during a mission.

upper stage--The portion of the launch system that injects the spacecraft (payload) from a parking orbit into the desired orbit or interplanetary trajectory.

Cassini Mission
Final Supplemental Environmental Impact Statement

Executive Summary

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